

FIGURE 1. IDEAL PROJECTILE PATTERN

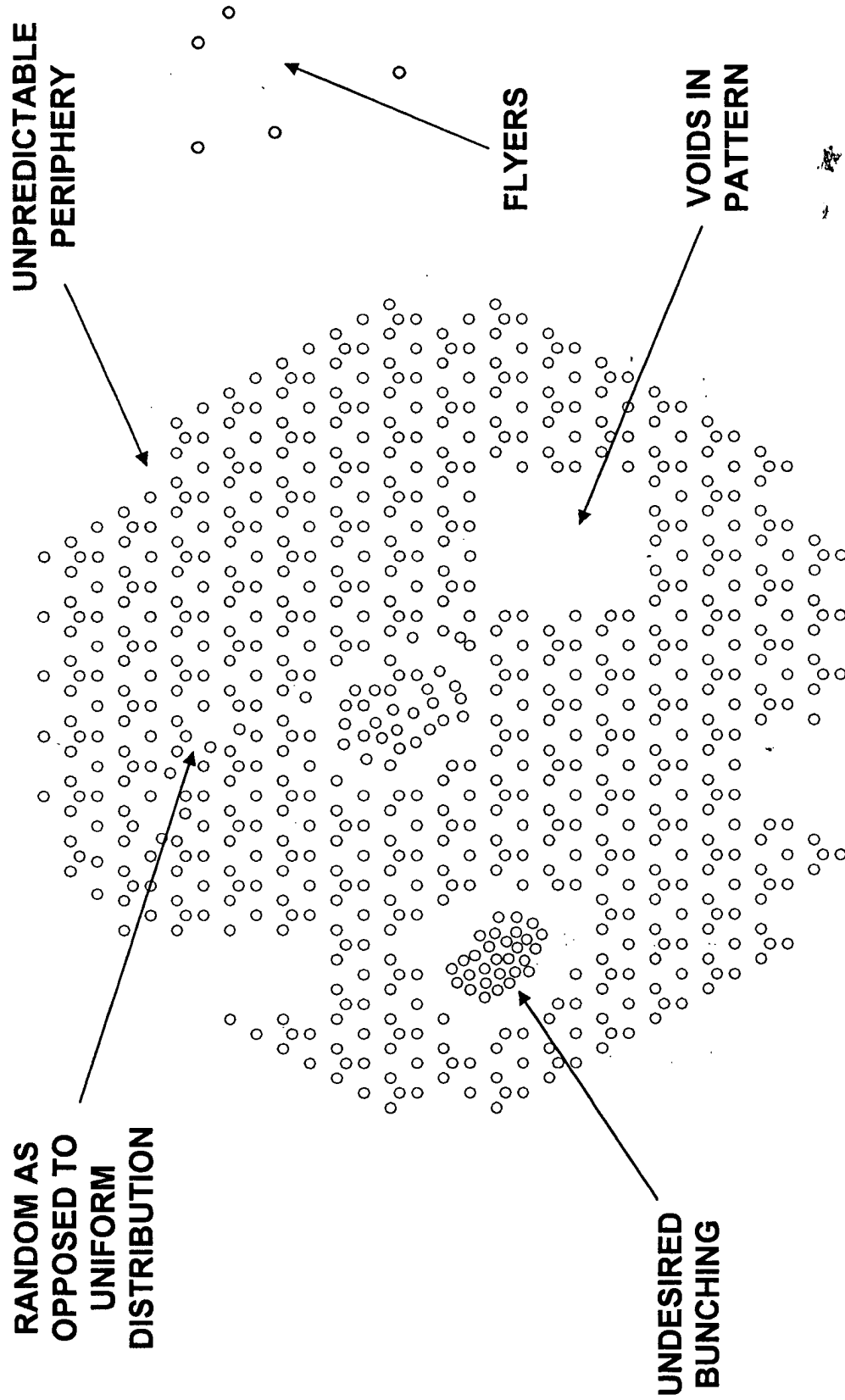
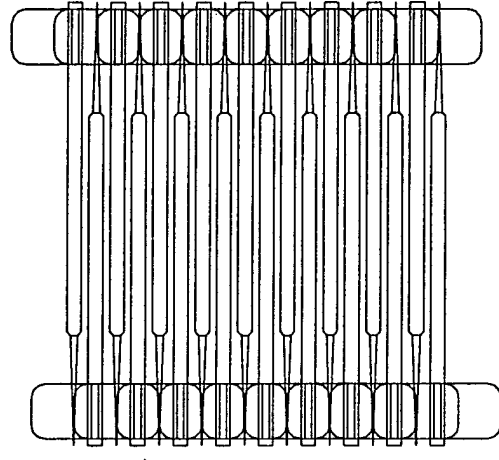
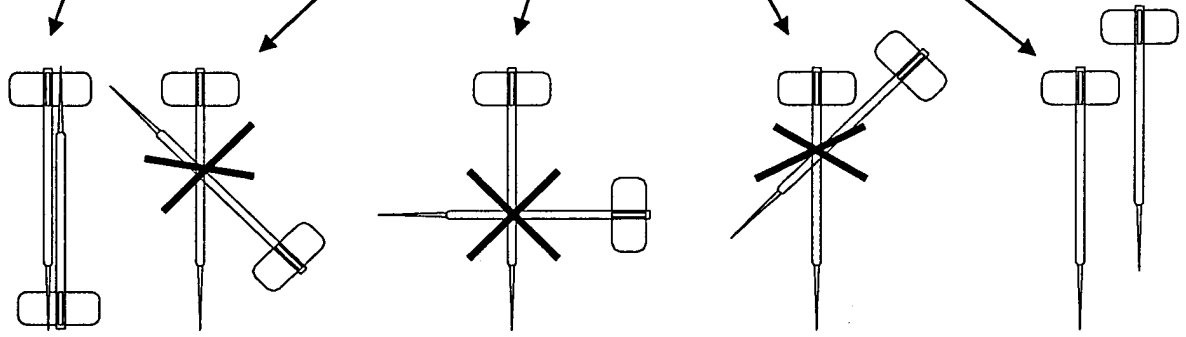


FIGURE 2. PRIOR ART TYPICAL PATTERN



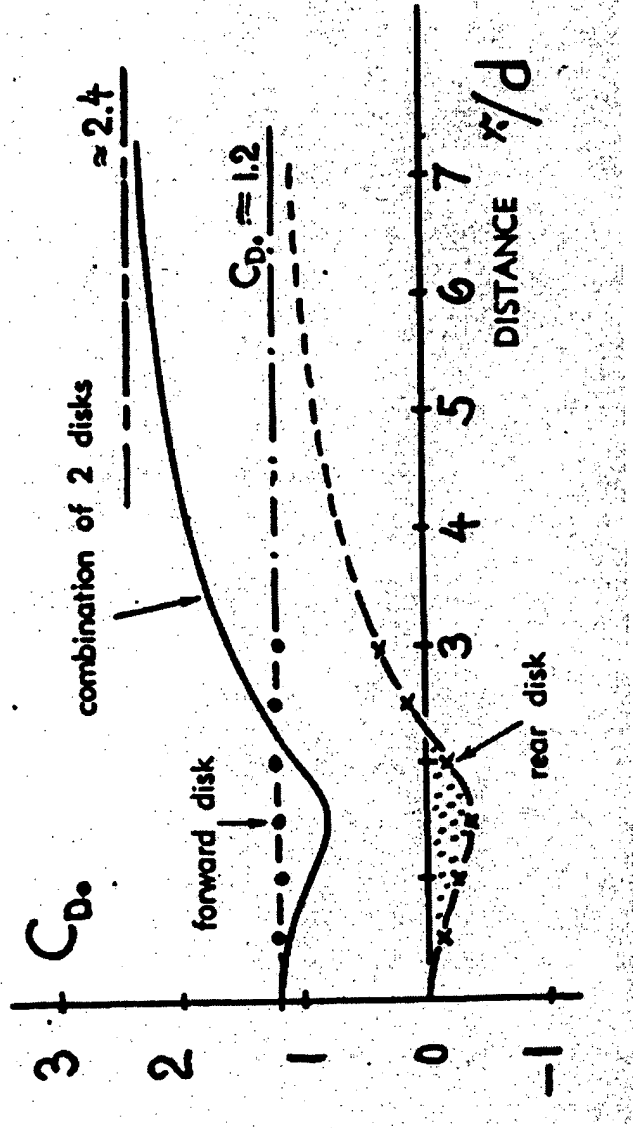
**FLECHETTES
PACKED NOSE
TO TAIL TO
INCREASE
DENSITY**

**FLOW TURNS 50% OF
PACKAGE 180 DEGREES**



- PROBLEMS INCLUDE
 - COLLISIONS AMONGST DARTS
 - VARYING ANGLES OF ATTACK
 - DIFFERENCES IN AXIAL SPACING
 - NON UNIFORMITY OF PATTERN

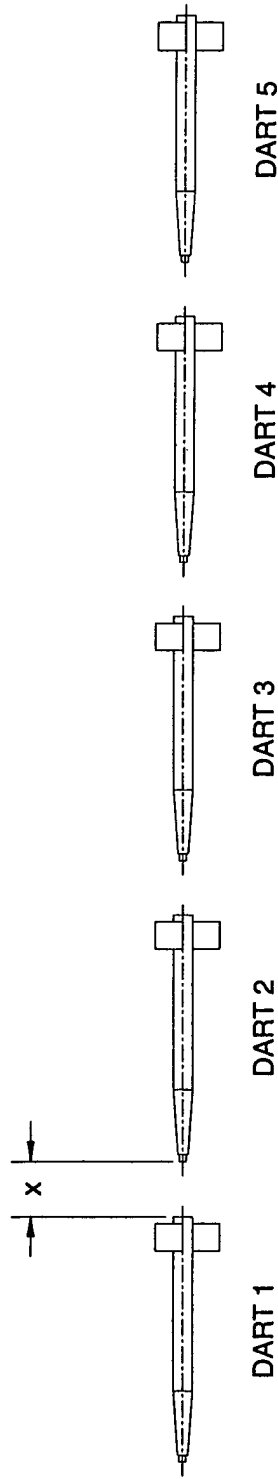
FIGURE 3. NOSE TO TAIL FLECHETTE PACKING



GENERAL TRENDS

- FOR SEPARATIONS WHERE $x/d < 2.2$ THE DRAG ON DISK 2 IS ACTUALLY NEGATIVE
- DRAG ON DISK 2 ASYMPTOTICALLY APPROACHES ITS FREE AIR DRAG AT $x/d = 7$

FIGURE 4. GENERAL DRAFTING TRENDS

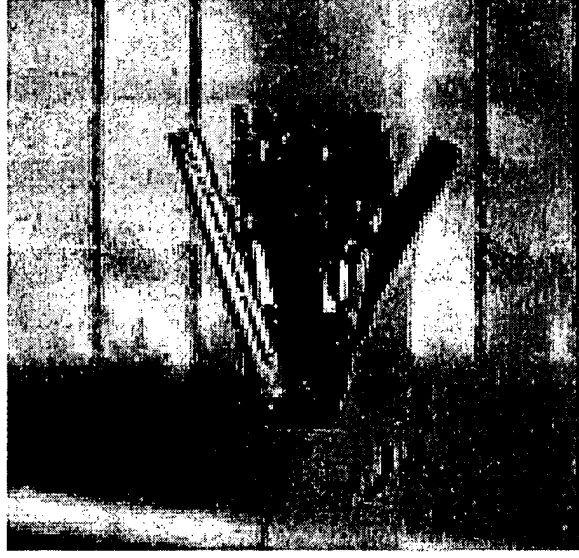


GAP, x (in)	DART 1 DRAG (lb _f)	DART 2 DRAG (lb _f)	DART 3 DRAG (lb _f)	DART 4 DRAG (lb _f)	DART 5 DRAG (lb _f)
0.25	2.1	1.25	1.1	0.9	0.8
1.00	2.1	1.4	1.2	1.1	0.9
2.00	2.1	1.5	1.3	1.2	1.1

Dart Velocity = 1500 ft/sec, Dart Mass = 35 g

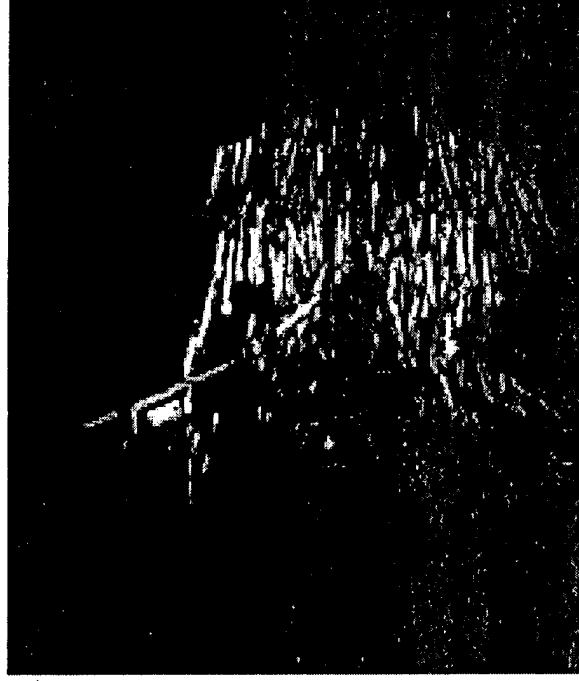
FIGURE 5. AERO DRAFTING MODEL RESULTS

SEPARATION = 0.25 in



t = 40 ms

SEPARATION = -0.50



t = 56 ms

SEPARATION = -3.00



t = 64 ms

FIGURE 6. TEST SHOWING DRAFTING PROBLEM

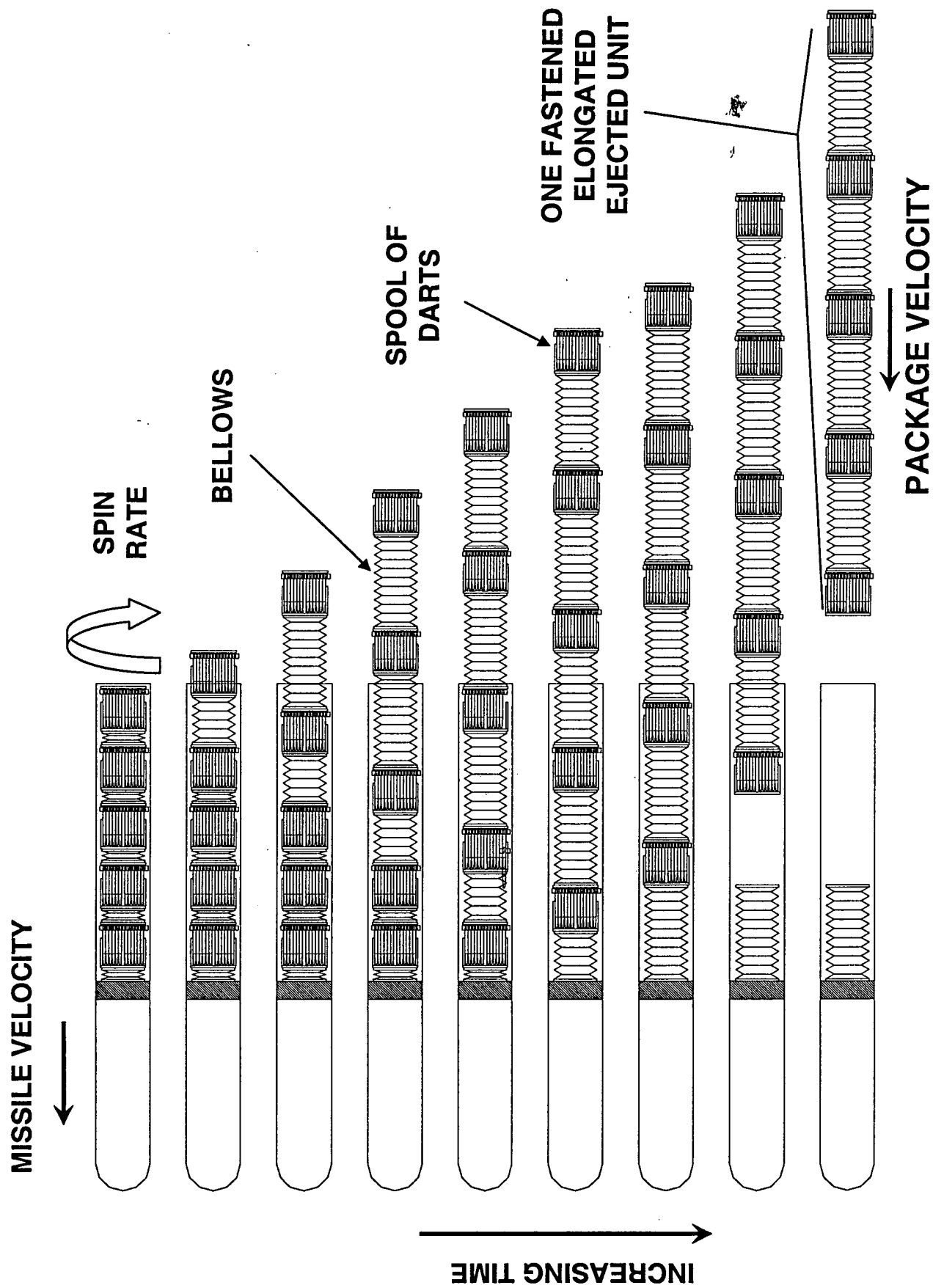


FIGURE 7. INTEGRATED BASE EJECTION

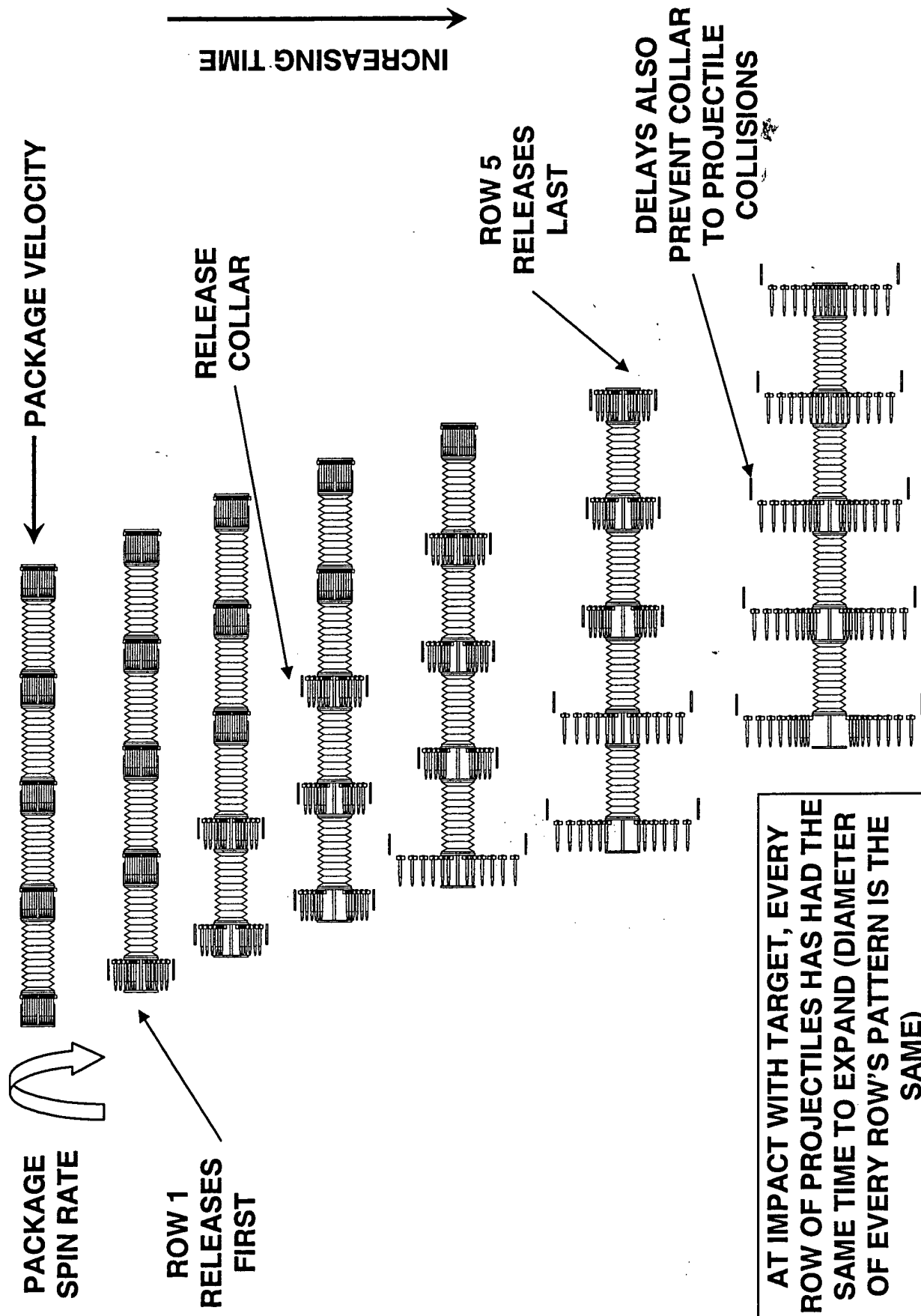


FIGURE 8. DELAYED RELEASE (INTEGRATED)

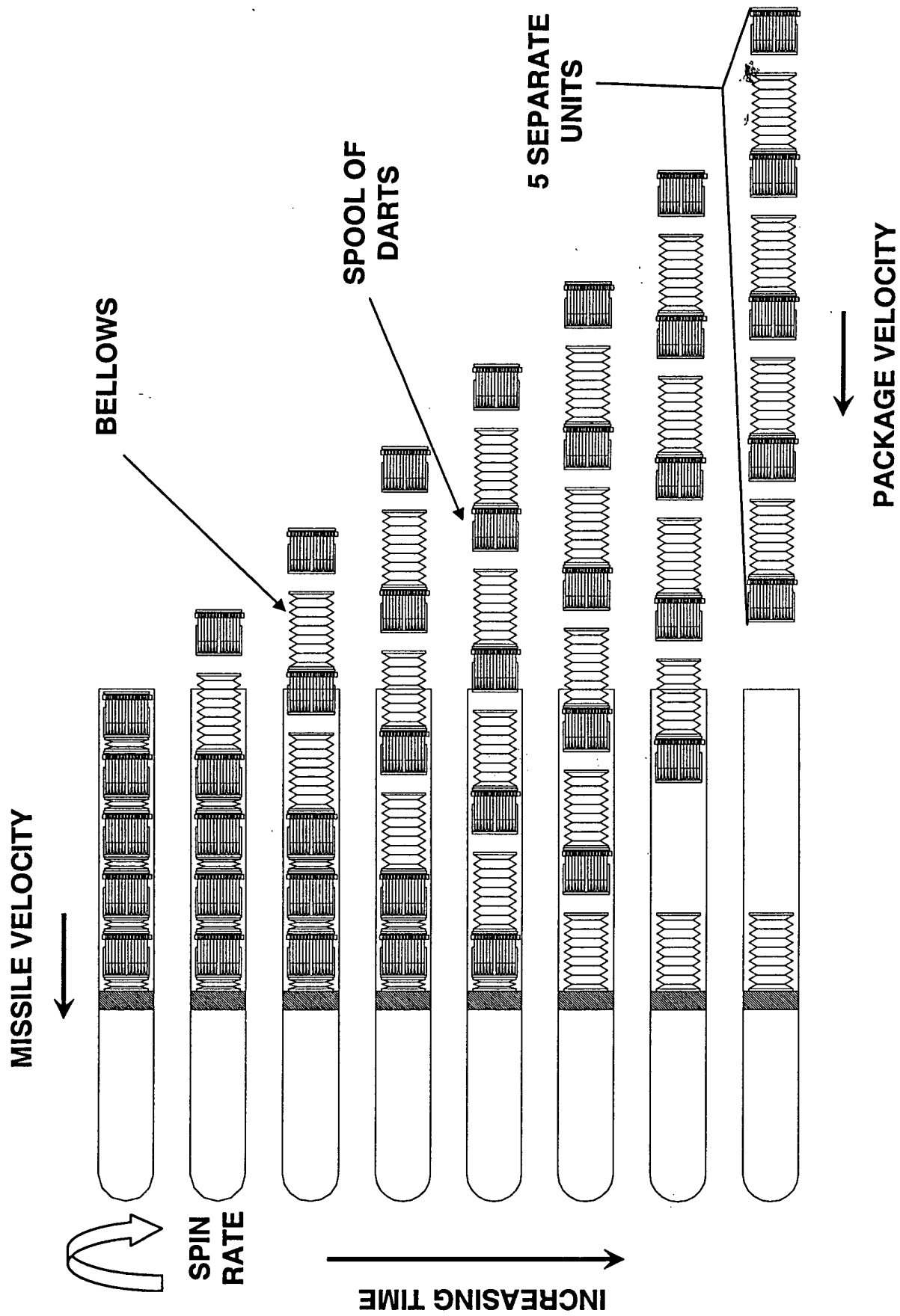


FIGURE 9. DISCREET BASE EJECTION

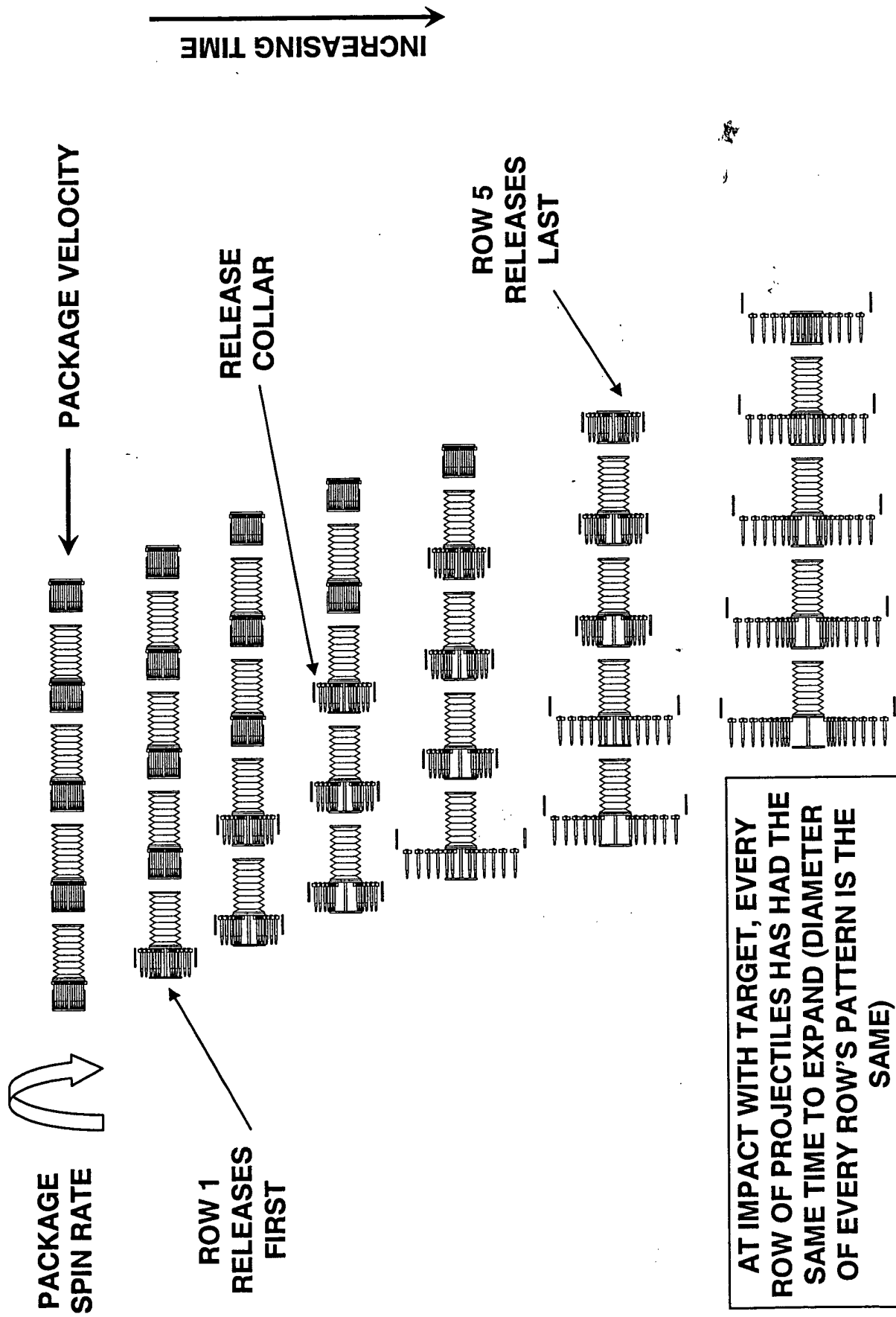


FIGURE 10. DELAYED RELEASE (DISCREET)

TEST ARTICLE SECTIONS

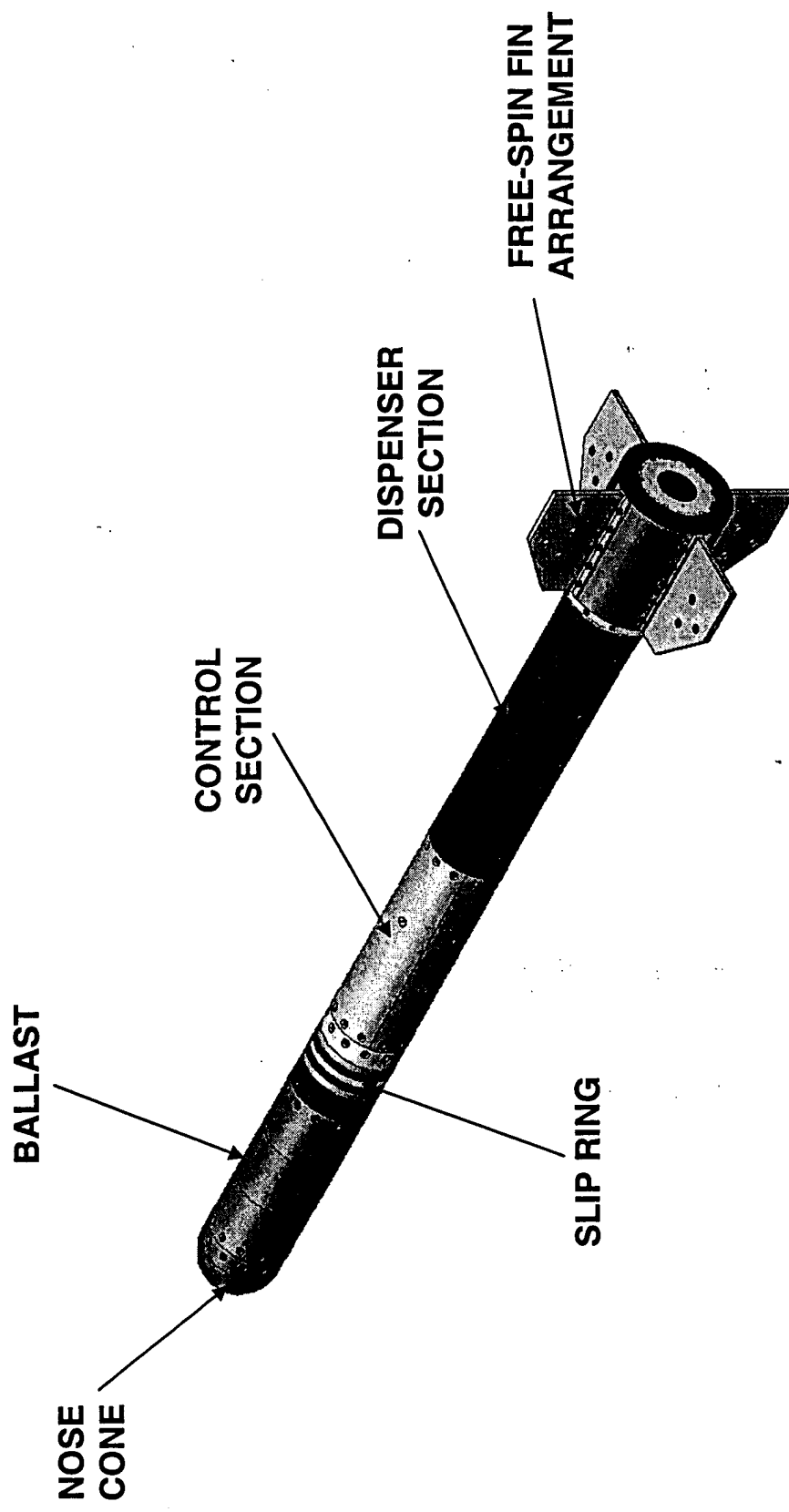


FIGURE 11. HYDRA-7 SLED TEST ARTICLE

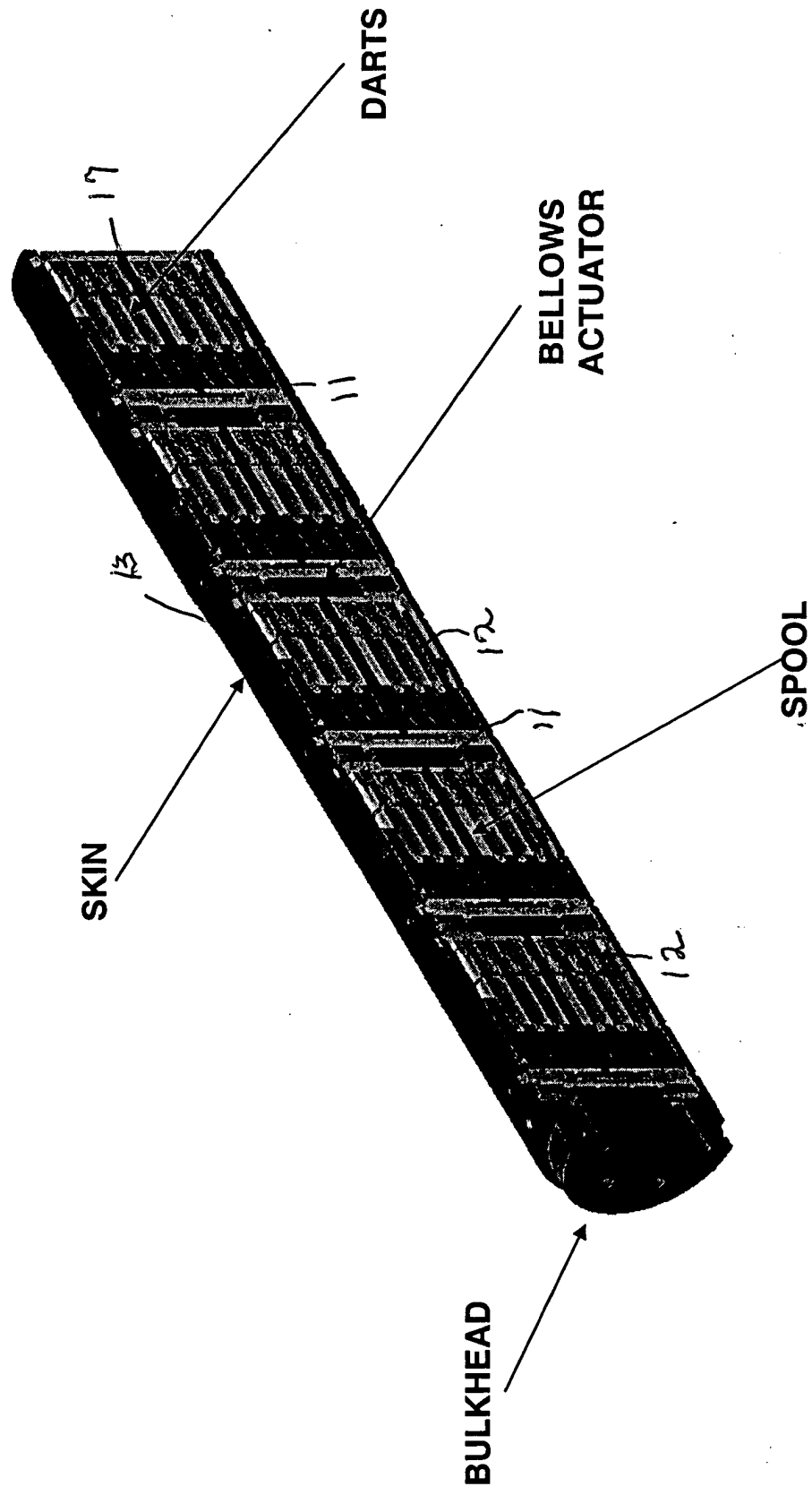


FIGURE 12. DISPENSER INBOARD PROFILE

CLIPS PROVIDE A FLEXIBLE MEANS OF CHOOSING A
DISCREET OR INTEGRAL DISPENSING MODE

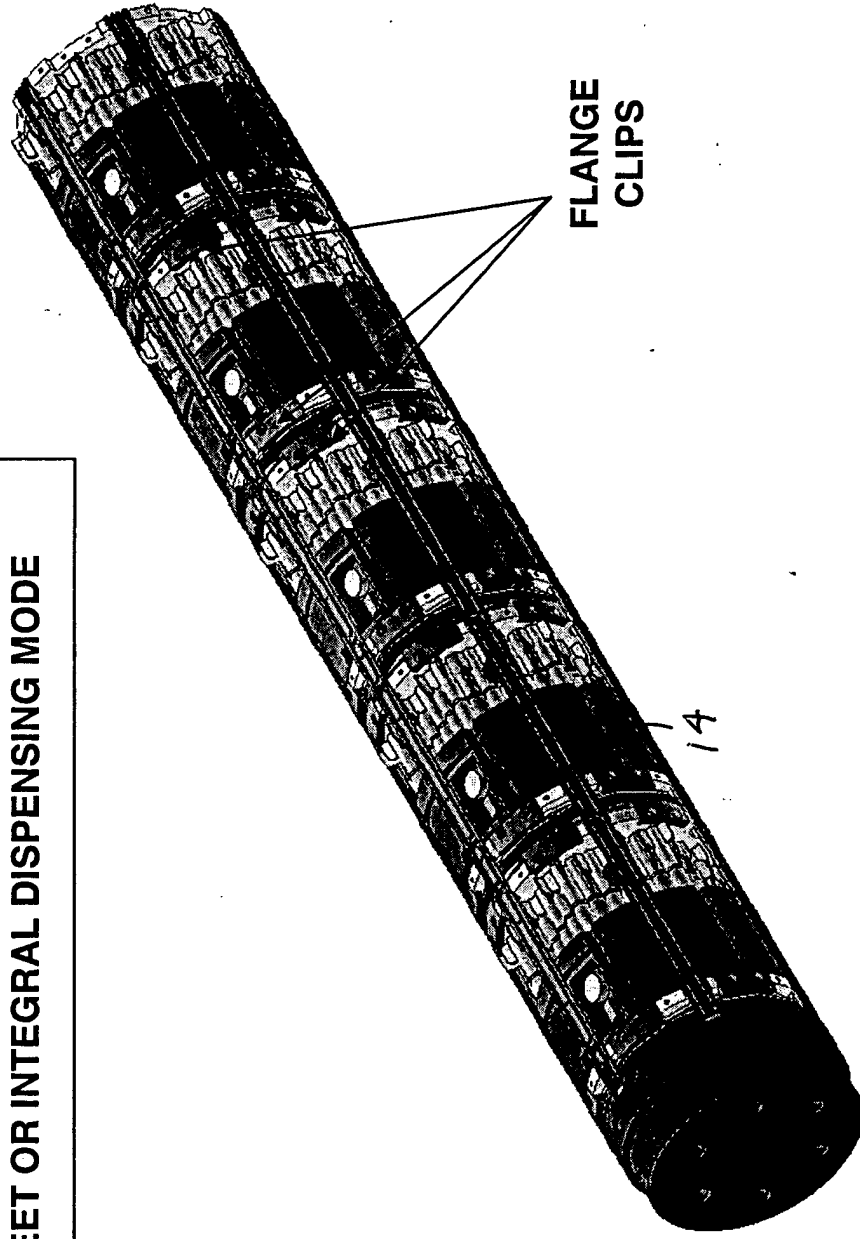


FIGURE 13. ATTACHMENT METHOD

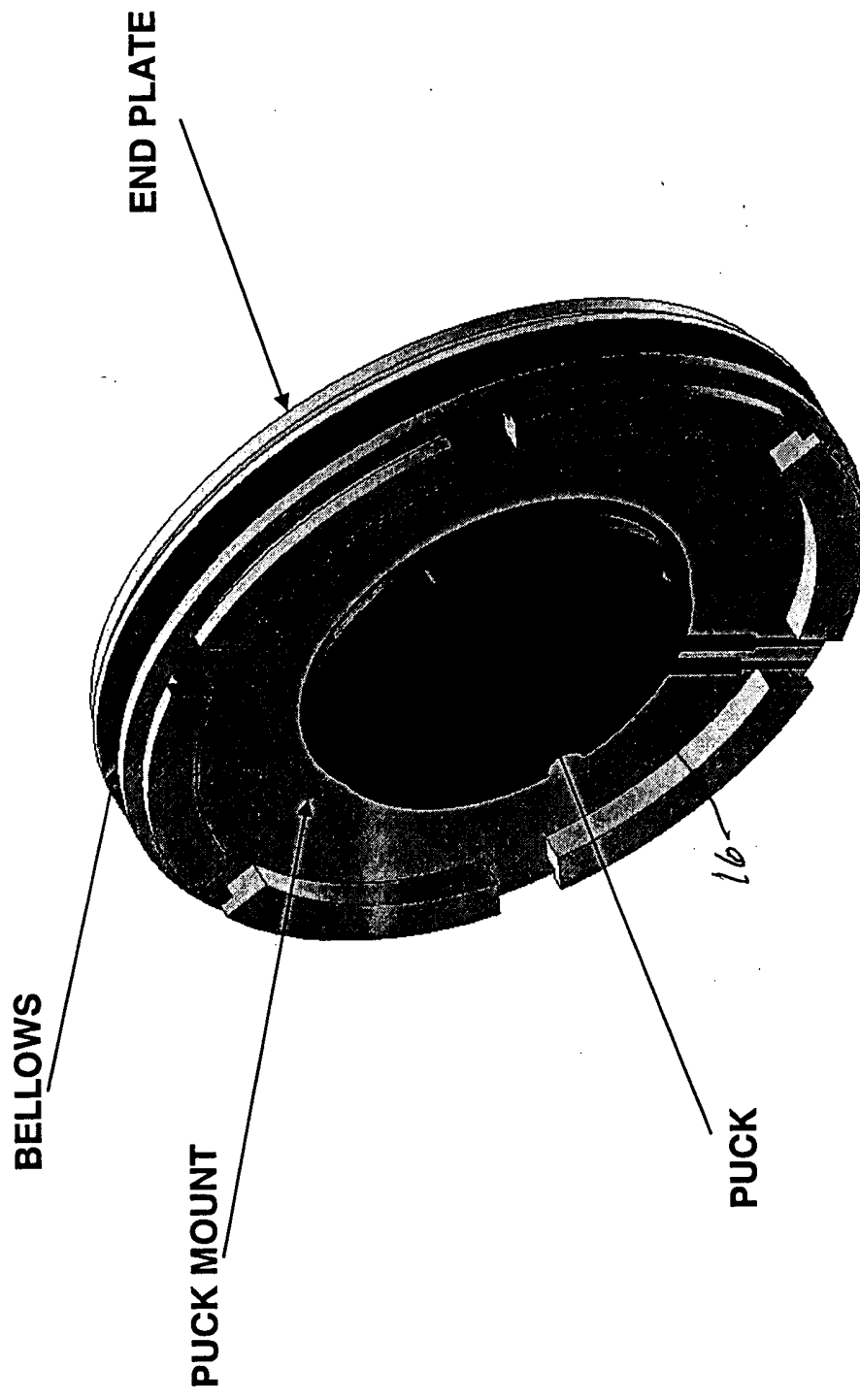


FIGURE 14. ENERGETIC BELLOWS ACTUATOR

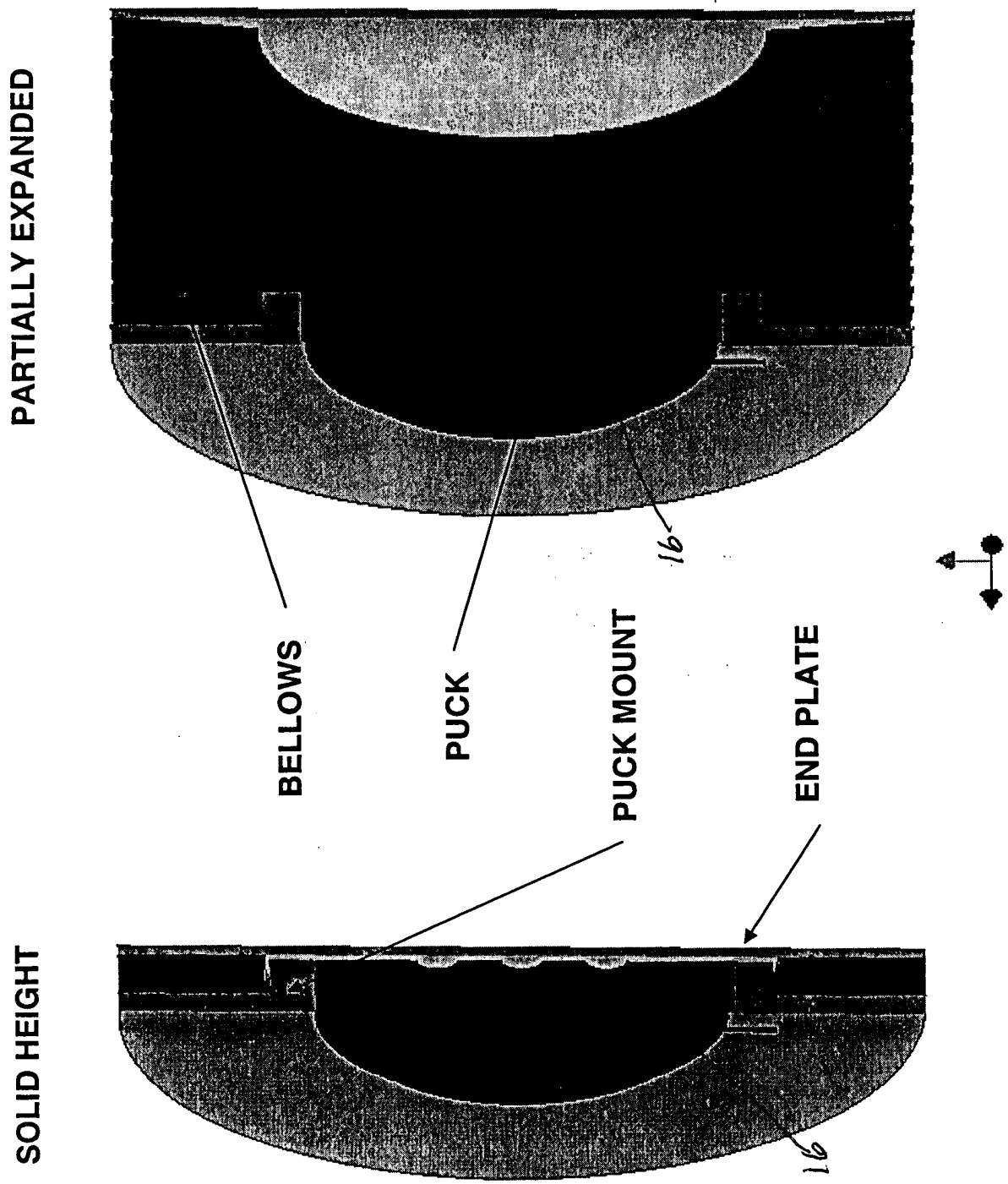


FIGURE 15. SECTIONED BELLOWS ACTUATOR

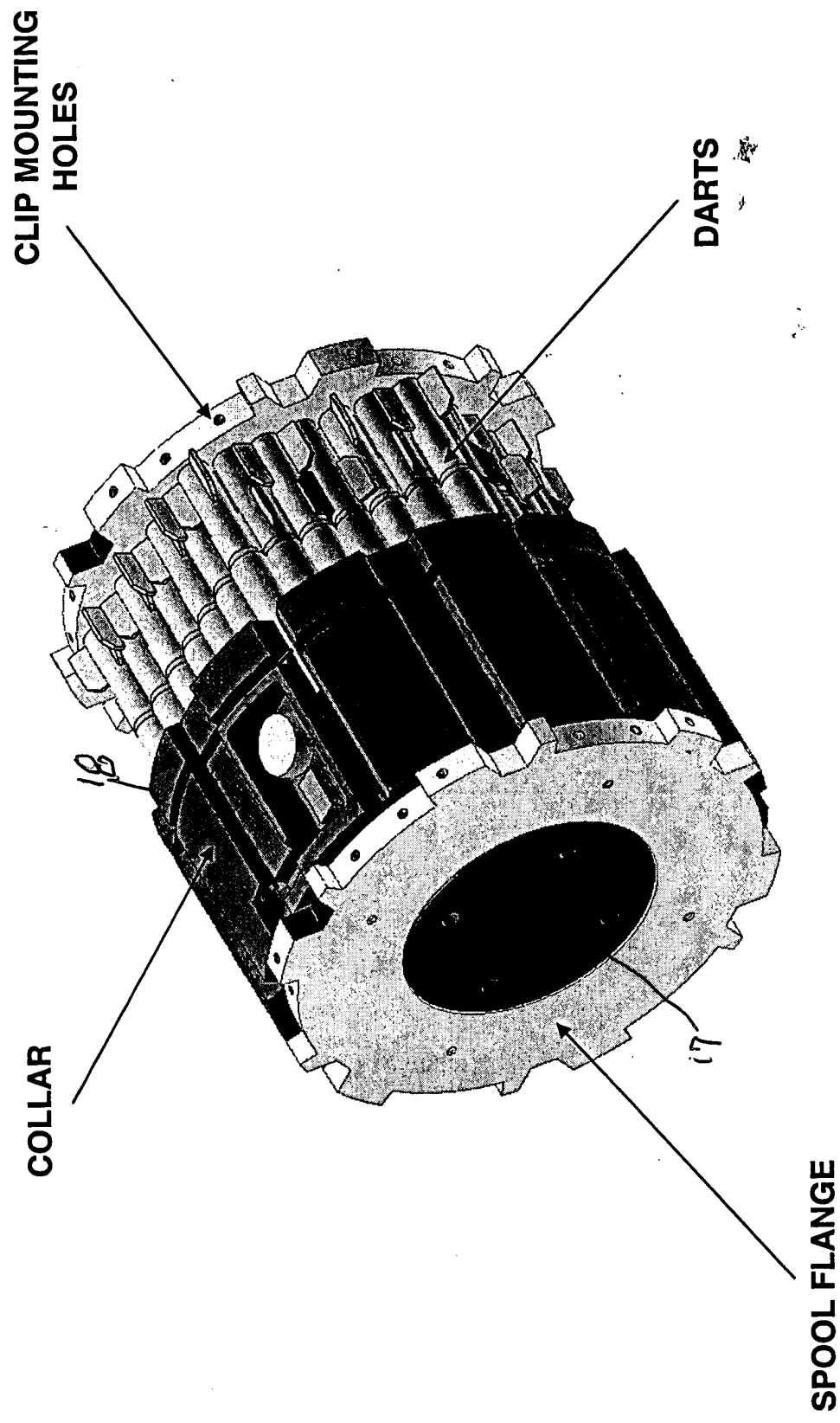


FIGURE 16. SPOOL ASSEMBLY

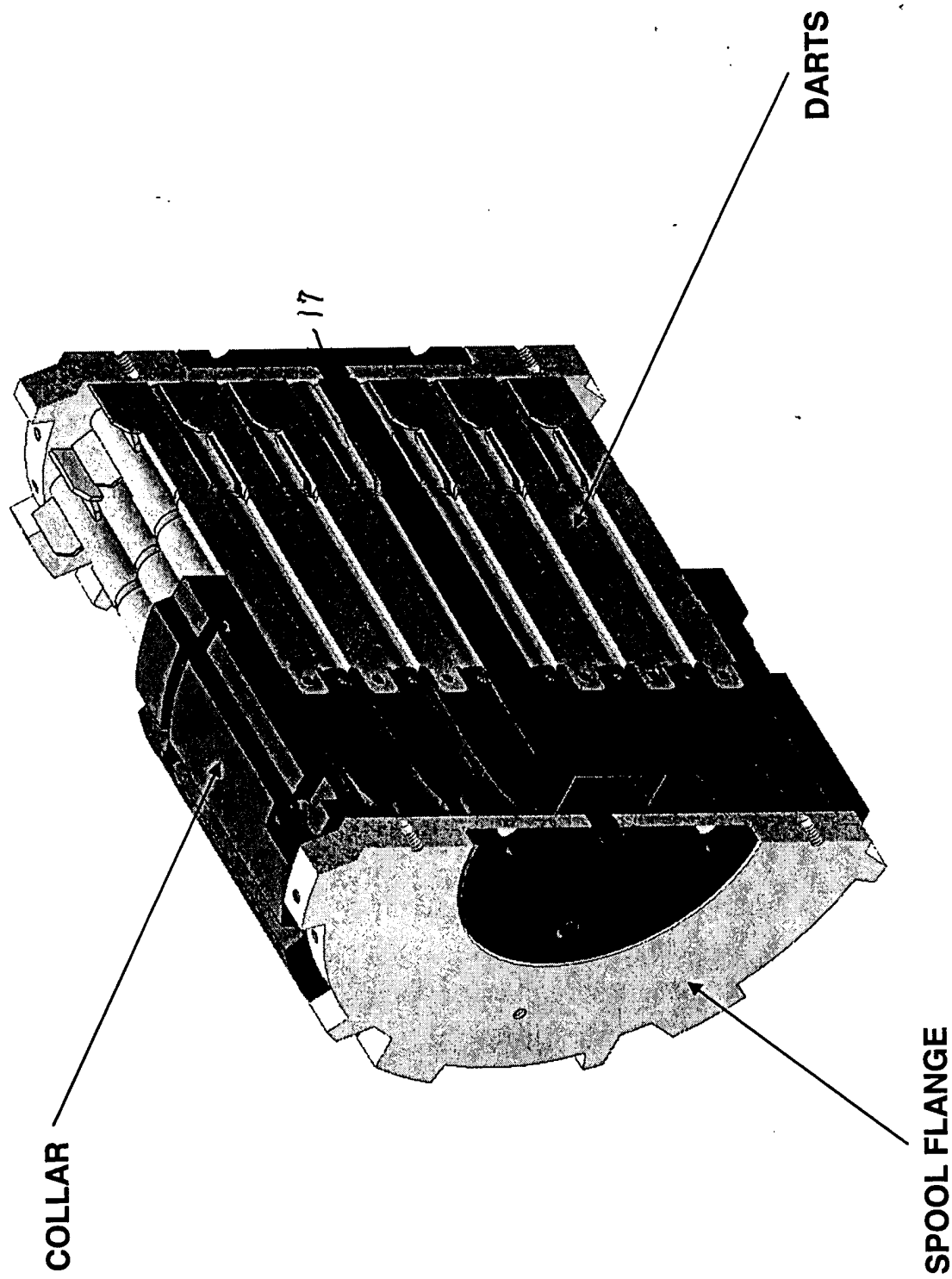


FIGURE 17. SECTIONED SPOOL ASSEMBLY

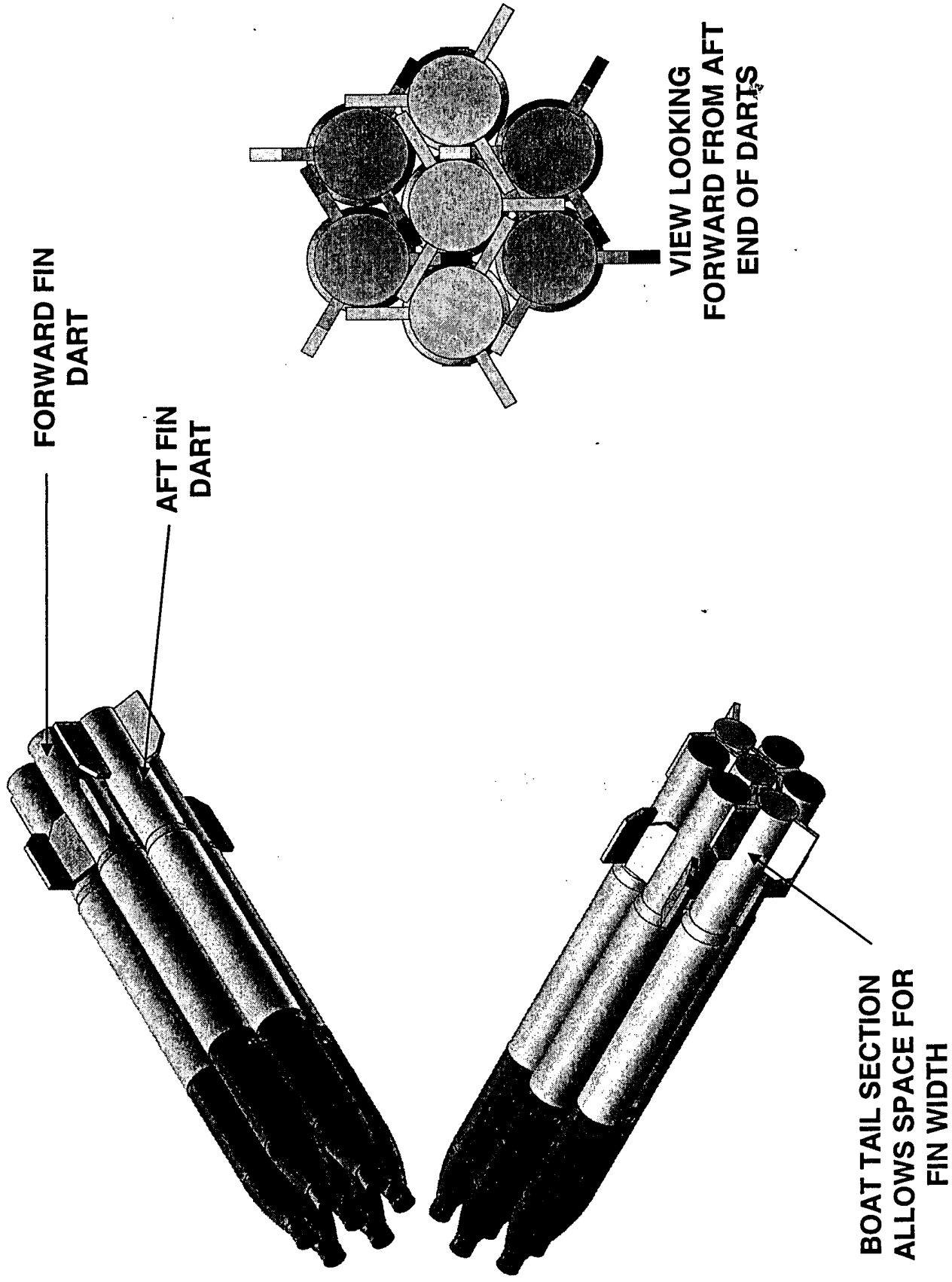


FIGURE 18. TRUE TANGENT PROJECTILE PACKING

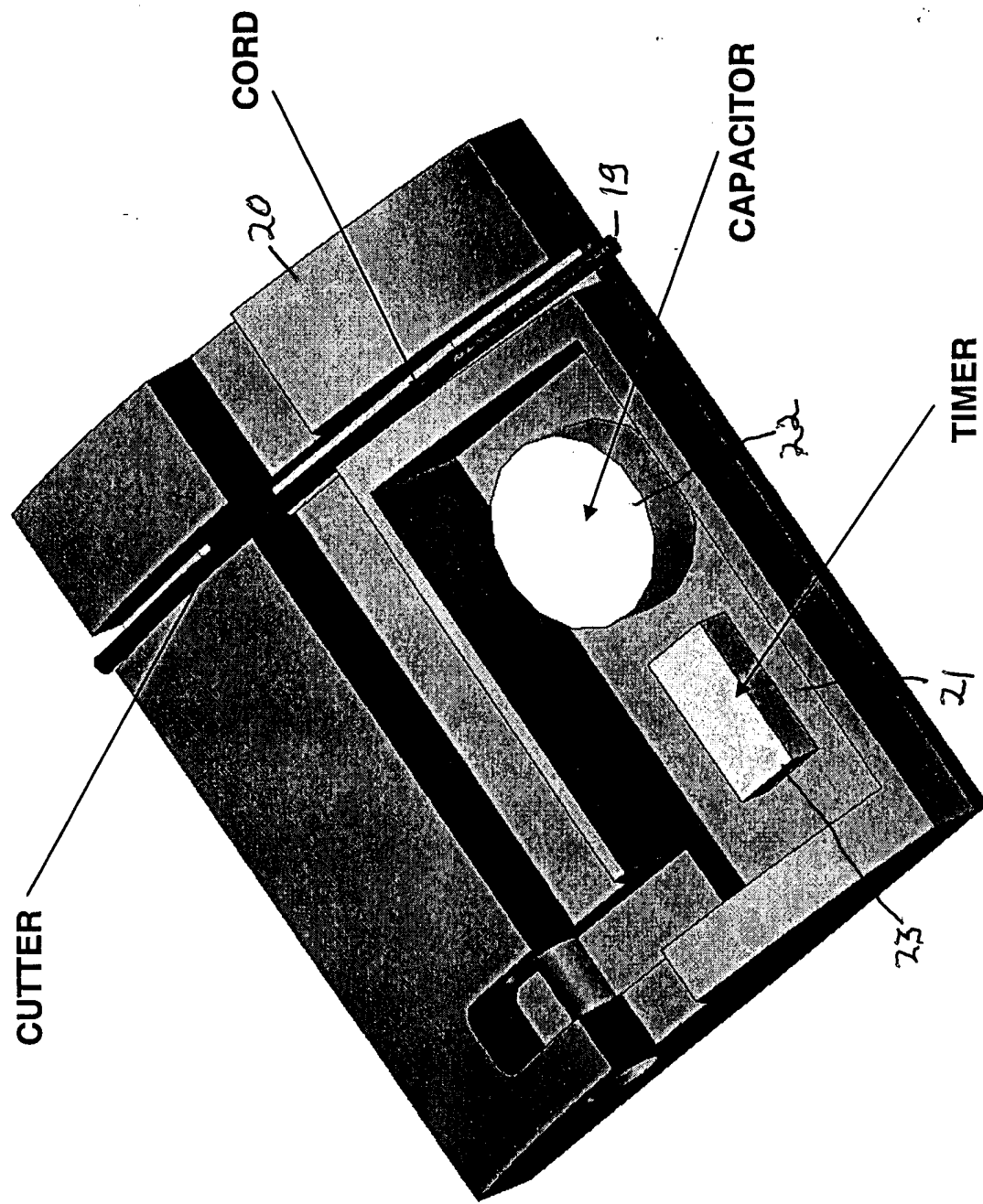
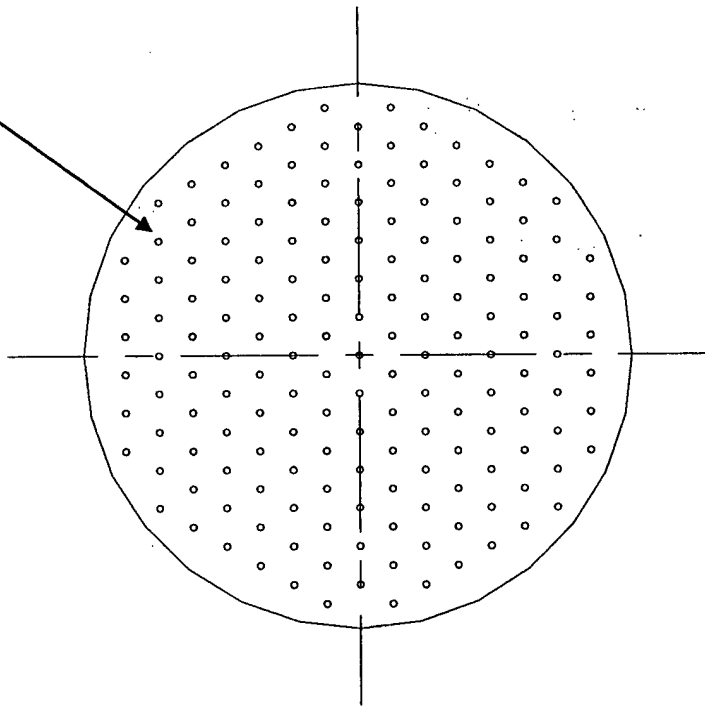


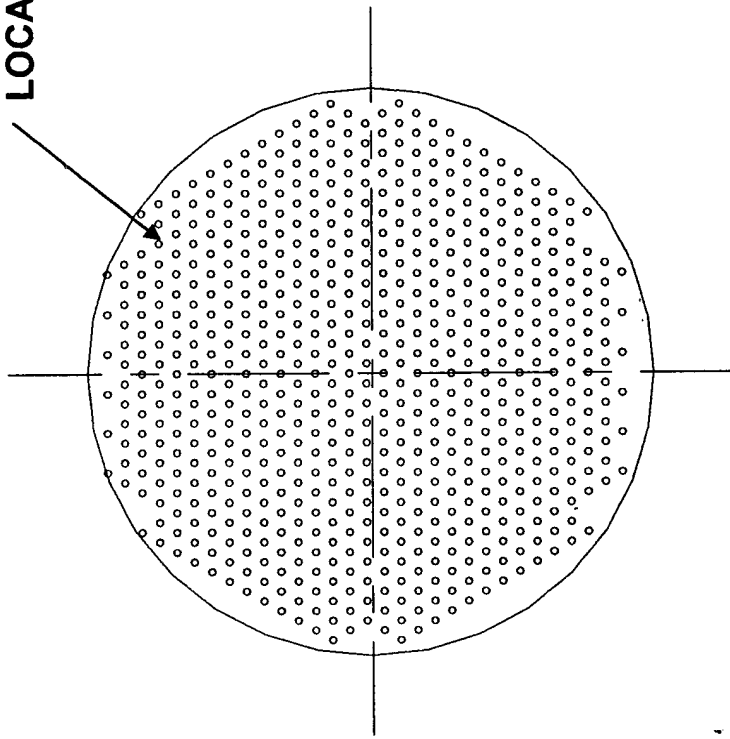
FIGURE 19. SMART COLLAR ASSEMBLY

**(4) PROJECTILES
HIT IN EVERY
LOCATION**



**WITHOUT OFFSETS
(504 PROJECTILES)**

**ONLY A SINGLE
PROJECTILE
HITS IN ANY ONE
LOCATION**



**WITH OFFSETS (504
PROJECTILES)**

FIGURE 20. PROJECTILE PATTERNS

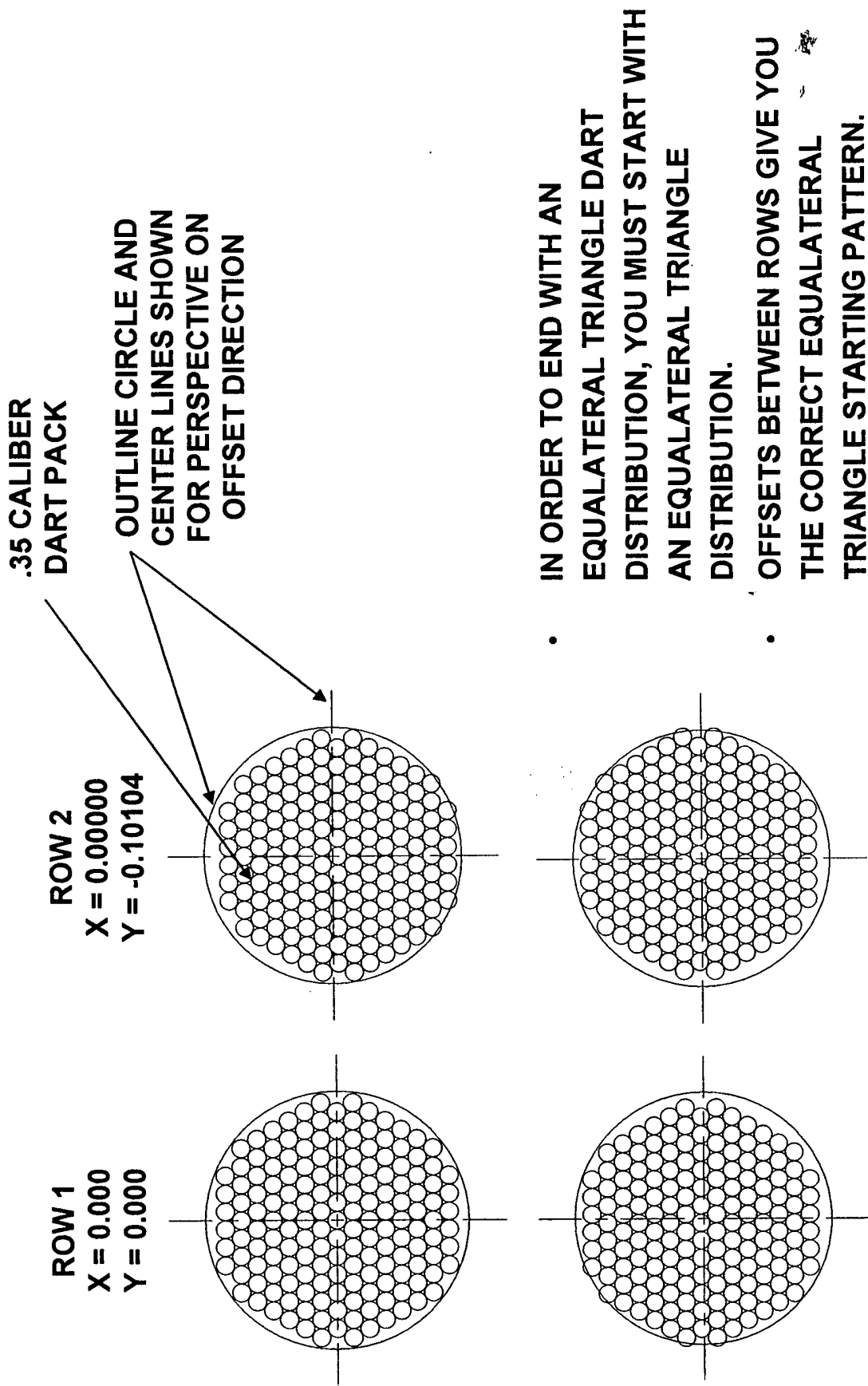


FIGURE 21. PROJECTILE ROW OFFSETS

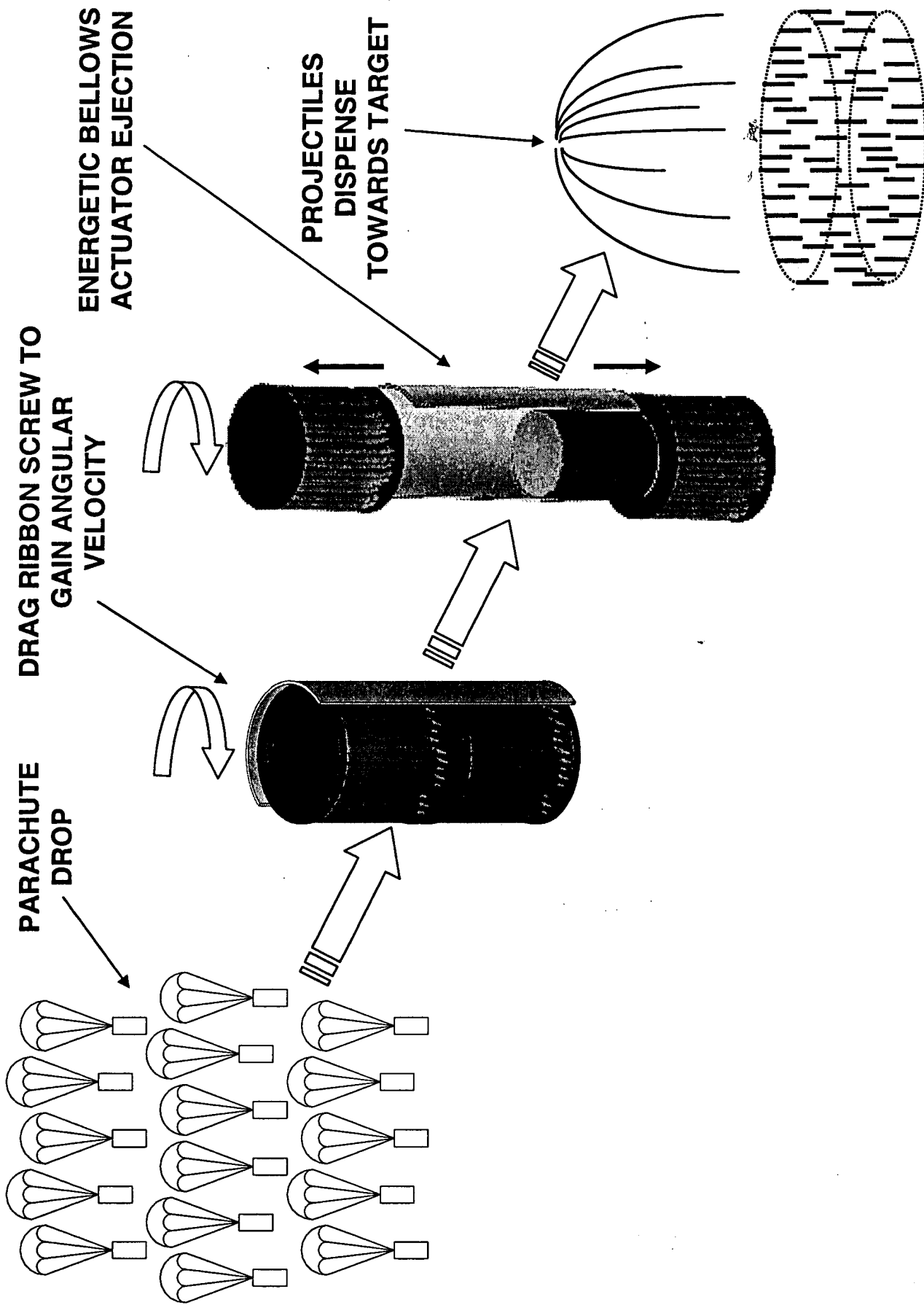


FIGURE 22. SUBMUNITIONS DISPENSER

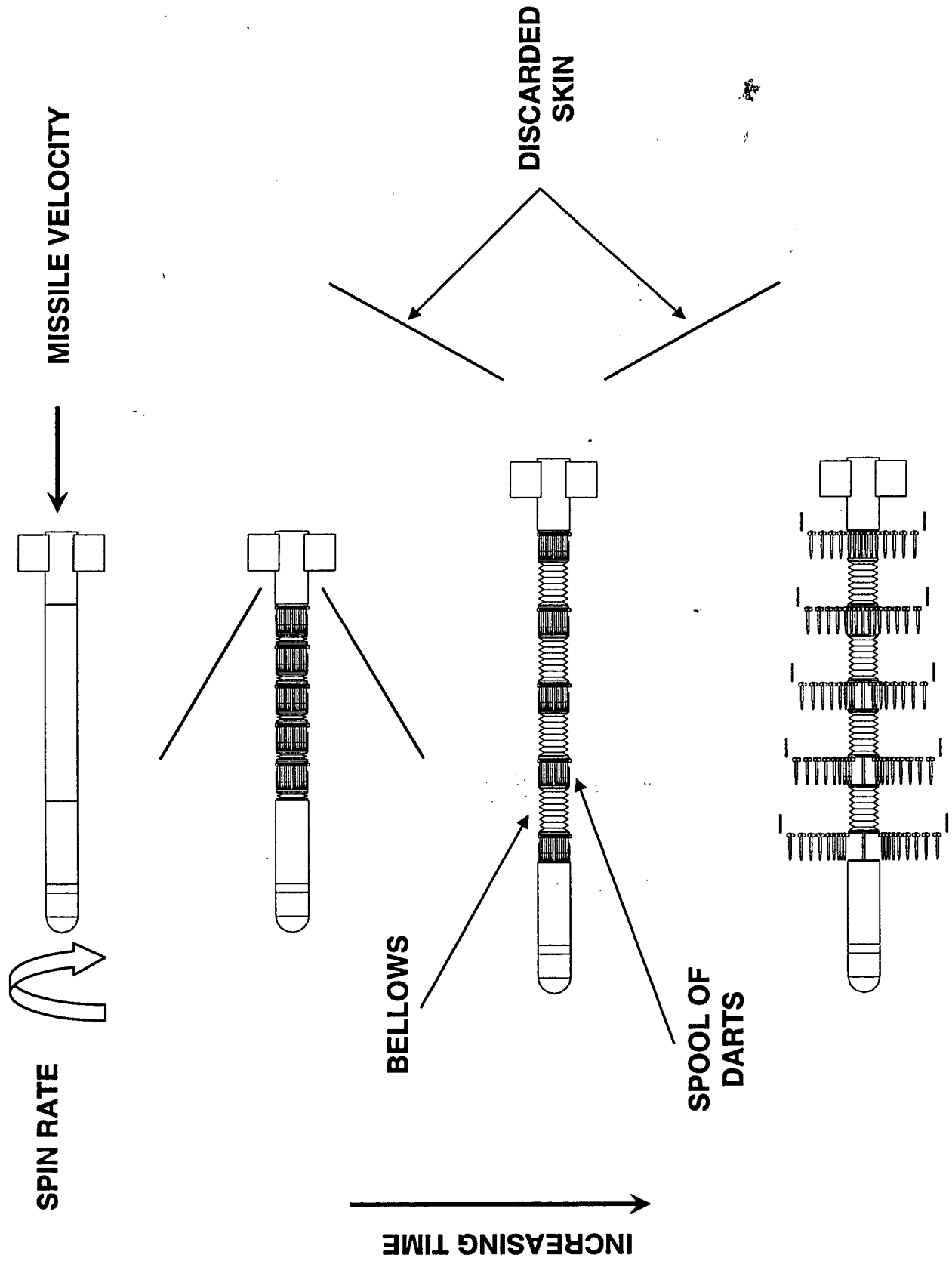


FIGURE 23. MISSILE ELONGATION CONCEPT